



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/646,532	08/22/2003	Kenneth S. Collins	6915 P03	8483

7590 12/28/2005

Patent Counsel, M/S 2061  
Legal Affairs Dept.  
Applied Materials, Inc.  
P.O. Box 450-A  
Santa Clara, CA 95035

EXAMINER

ARANCIBIA, MAUREEN GRAMAGLIA

ART UNIT PAPER NUMBER

1763

DATE MAILED: 12/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/646,532

Applicant(s)

COLLINS ET AL.

Examiner

Maureen G. Arancibia

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 14 October 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-58 is/are pending in the application.
- 4a) Of the above claim(s) 11, 13-25, 27 and 34-58 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10, 12, 26 and 28-33 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 9/03; 11/03; 4/04.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☒ Other: IDS 5/04; 3/05; 5/05; 11/05.

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election without traverse of Species I, Claims 1-10, 12, 26, and 28-33 in the reply filed on 14 October 2005 is acknowledged.
2. Claims 11, 13-25, 27, and 34-58 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to nonelected species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 14 October 2005.

### ***Claim Objections***

3. **Claim 12 objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim.** Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Specifically, Claim 1 already recites "a supply of process gas for furnishing to said gas distribution devices a process gas" in Lines 17-18, so the recitation in dependent Claim 12 of "a gas supply containing said process gas" appears to fail to further limit independent Claim 1.

### ***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:  
  
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
5. **Claims 1-10, 12, 26, and 28-33 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

Claim 1 recites the limitation "said wafer support pedestal" in Line 11. There is insufficient antecedent basis for this limitation in the claim, since elsewhere in the claim, the component is identified as "a workpiece support pedestal."

Also, Claim 1 recites "said gas distribution devices" in Lines 17-18. There is insufficient antecedent basis for this limitation in the claim, since only a "gas distribution apparatus" is recited earlier in the claim. For the purposes of the following examination on the merits, this phrase has been interpreted as simply referring to a gas distribution apparatus.

Also, it is unclear what Applicant intends to claim by reciting "an RF bias **power** generator" in Claim 29 versus "an RF bias **voltage** generator" in Claim 30. It is unclear whether these two terms should be interpreted differently, and if so, where support for such interpretation may be located in the Specification. Clarification and/or correction is requested.

Claims 2-10, 12, 26, 28, and 31-33 are rejected due to their dependence on Claim 1.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Art Unit: 1763

**6. Claims 1-10, 12, 26, and 28-33 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent Application Publication 2003/0029567 to Dhindsa et al.**

In regards to Claims 1-8, 10, 12, 26, and 29-33, Dhindsa et al. teaches a capacitively coupled plasma apparatus (Figure 1), comprising an enclosure 12 comprising a side wall 14 and a ceiling 16 defining a chamber; a workpiece support pedestal 28 coupled to an RF return potential via conductive plate 26 (Paragraph 24), said workpiece support pedestal facing an interior surface of the ceiling so as to define therebetween a process region 38 extending generally across the diameter of said workpiece support pedestal; an RF plasma source generator 54 coupled to the ceiling 22 for capacitively coupling RF source power into said chamber; a gas distribution apparatus (gas distribution plate or showerhead) and a supply of process gas (Paragraph 25); and an RF bias generator 60 having an RF bias frequency of about 2 MHz coupled to the workpiece support pedestal via electrode 34. (Paragraphs 24 and 25)

It has been held that a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987)

In this case, the plasma reactor taught by Dhindsa et al. includes all of the structural limitations of Claims 1-8, 10, 12, 26, and 29-33, and would be capable of performing plasma immersion ion implantation, based on the process settings. The gas

distribution apparatus taught by Dhindsa et al. would be inherently capable of introducing process gas containing a species to be ion implanted into a layer of the workpiece. The RF bias with a frequency of about 2 MHz coupled to the workpiece support pedestal taught by Dhindsa et al. would inherently meet the limitations of Claims 2-4 and 29-33, including that the RF bias power generator can control a sheath voltage across a plasma sheath overlying the workpiece support pedestal, depending on the other process settings of the plasma reactor. Moreover, the frequency of about 2 MHz meets the limitations recited in Claims 5-8. The bias voltage can correspond to an implantation depth to which a species is to be implanted into a layer, again based on the other process settings if the apparatus taught by Dhindsa et al. were used for the recited intended use of plasma immersion ion implantation.

This rejection is based on the fact the apparatus structure taught above has the inherent capability of being used in the manner intended by the Applicant. When a rejection is based on inherency, a rejection under 35 U.S.C. 102 or U.S.C. 103 is appropriate. (See *In re Fitzgerald* 205 USPQ 594 or MPEP 2112).

Also note that the inclusion of material or article worked upon by a structure being claimed does not impart patentability to the claims. *In re Young*, 75 F.2d 966, 25 USPQ 69 (CCPA 1935) (as restated in *In re Otto*, 312 F.2d 937, 136 USPQ 458, 459 (CCPA 1963)).

In regards to Claims 9 and 28, Dhindsa et al. teaches that the enclosure comprises a base 18, and that the gas distribution apparatus comprises a plurality of

Art Unit: 1763

devices and diffusers (*baffles and openings*; Paragraph 25) on the interior surface of the ceiling, as broadly recited in the claims.

### ***Double Patenting***

7. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

**8. Claims 1-8, 10, 12, and 29-33 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-5 and 53-58 of copending Application No. 10/646,612 ('612).**

**Although the conflicting claims are not identical, they are not patentably distinct from each other because:**

The corresponding claims of '612, while reciting a method, recite all of the structural limitations of the instant claims, and thus render them obvious:

Claims 1, 2, and 12 are rejected over Claim 1 of '612. Claims 3-8 are rejected over Claims 53-58 of '612. Claim 10 is rejected over Claim 5 of '612. Claims 29-33 are rejected over Claims 2-4 of '612.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

**9. Claims 1-8, 10, 12, and 29-33 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-8, 31-33, 57 and 58 of copending Application No. 10/646,526 ('526).**

The corresponding claims of '526 recite all of the structural limitations of the instant claims, and thus render them obvious:

Claims 1 and 12 are rejected over Claim 1 of '526. Claims 2-8 are rejected over Claims 18-24 of '526. Claim 10 is rejected over Claim 5 of '526. Claims 29-33 are rejected over Claims 13-15 of '526.

The apparatus recited in Claim 1 of '526 is considered to be capable of performing the intended use recited in instant Claim 10 of having the bias voltage correspond to an implantation depth to which a species is to be implanted in a layer, based on the structural features recited in Claim 1. This rejection is based on the fact the apparatus structure taught above has the inherent capability of being used in the manner intended by the Applicant. When a rejection is based on inherency, a rejection under 35 U.S.C. 102 or U.S.C. 103 is appropriate. (See *In re Fitzgerald* 205 USPQ 594 or MPEP 2112).

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

**10. Claims 9, 26, and 28 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over**



**claim 1 of copending Application No. 10/646,612 ('612) in view of Dhindsa et al., or alternatively, over claim 1 of copending Application No. 10/646,526 ('526) in view of Dhindsa et al.**

The teachings of Claim 1 of each of '612 and '526 were discussed above.

Neither teaches that the gas distribution apparatus can comprise a gas distribution plate or a plurality of devices or diffusers on one of the side wall, ceiling, or base of the enclosure.

Dhindsa et al. teaches that a gas distribution apparatus comprises a gas distribution plate comprising a plurality of devices and diffusers (*baffles and openings*; Paragraph 25) on the interior surface of the ceiling of an enclosure (Figure 1).

It would have been obvious to one of ordinary skill in the art to modify the teachings of either of Claim 1 of '612 or '526 to include a gas distribution plate comprising a plurality of devices and diffusers, as taught by Dhindsa et al. The motivation for making such a modification, as taught by Dhindsa et al. (Paragraph 25), would have been to deliver the process gas to the process region with a showerhead effect.

This is a provisional obviousness-type double patenting rejection.

### **Conclusion**

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent 4,579,618 to Celestino et al. teaches that an RF source power generator 37 can be capacitively coupled to a wafer support pedestal 18 and a chamber enclosure 15 can be coupled to an RF return potential (Figure 1;

Art Unit: 1763

Column 2, Lines 56-57). U.S. Patent 5,885,358 to Maydan et al. teaches a gas distribution comprising a plurality of discrete injection nozzles 100 on a side wall of an enclosure. (Figure 3) U.S. Patent 6,036,878 to Collins teaches a plurality of discrete injection nozzles 137 on a base of an enclosure. (Figure 1)

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maureen G. Arancibia whose telephone number is (571) 272-1219. The examiner can normally be reached on core hours of 10-5, Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Maureen G. Arancibia  
Patent Examiner  
Art Unit 1763



Parviz Hassanzadeh  
Supervisory Patent Examiner  
Art Unit 1763